MAGNITUDE 7 METALS LLC

Summary Report for ERT

METHOD 14 LINE 2

Run Number 3 | 11/3/2021 | EPA Method # 5 & 14

AVG. ALUMINUM PRODUCTION RATE	8.53	TON/HR./LINE
PROCESS DATA CORRECTION FACTOR FOR ROOF EMISSIONS FROM PART (LB/HR)	0.002340	FACTOR
PROCESS DATA CORRECTION FACTOR FOR ROOF EMISSIONS FROM FLUORIDE (LB/HR)	0.002340	FACTOR
% ISOKINETIC (MANIFOLD to ROOF)	97.0	%
% ISOKINETIC (MANIFOLD to ROOF) CORRECTION FACTOR		
TOTAL PARTICULATE COLLECTED	35.5	MG
PARTICULATE CORRECTED FOR %ISOKINETIC > 120		
SECONDARY PARTICULATE CONCENTRATION	6.09E-04	GRAINS/DSCF
SECONDARY PARTICULATE EMISSION DUCT RATE	7.91E-03	LBS./HR.
SECONDARY PARTICULATE EMISSION DUCT RATE	9.28E-04	LBS./TON
SECONDARY PARTICULATE EMISSION	28.84	LBS./HR.
SECONDARY PARTICULATE EMISSION	3.38	LBS./TON
SECONDARY PARTICULATE EMISSION USING CORRECTION FACTOR	3.38	LBS./TON
PRIMARY PARTICULATE EMITTED	1.45	LBS./TON
PRIMARY AND SECONDARY PARTICULATE EMITTED	4.83	LBS./TON
TOTAL FLUORIDE COLLECTED	9.29	MG
FLUORIDE CORRECTED FOR %ISOKINETIC > 120		
SECONDARY FLUORIDE CONCENTRATION	1.59E-04	GRAINS/SCF
SECONDARY FLUORIDE EMISSION DUCT RATE	2.07E-03	LBS./HR.
SECONDARY FLUORIDE EMISSION DUCT RATE	2.43E-04	LBS./TON
SECONDARY FLUORIDE EMISSION	7.547	LBS./HR.
SECONDARY FLUORIDE EMISSION	0.885	LBS./TON
SECONDARY TOTAL FLUORIDE EMISSION USING CORRECTION FACTOR	0.885	LBS./TON
TOTAL PRIMARY FLUORIDE EMITTED	0.218	LBS./TON
TOTAL PRIMARY AND SECONDARY FLUORIDE EMITTED	1.103	LBS./TON

MAGNITUDE 7 METALS LLC

METHOD 14 SAMPLE RESULTS

LINE 2

Run Number 3 | 11/3/2021 - 11/4/2021 | EPA Method # 5 & 14

METER VOLUME	903.080	CU. FT.
SQUARE ROOT OF DELTA P	0.363	SQ. ROOT IN. WATER
AVERAGE DELTA H	1.467	IN. WATER
METERED GAS TEMPERATURE	71.8	DEG. F
STATIC PRESSURE IN STACK	-0.73	IN. WATER
STACK TEMPERATURE	74.4	DEG. F
BAROMETRIC PRESSURE	30.00	IN. Hg
PROBE TIP DIAMETER	0.3169	INCHES
GAS METER CORRECTION FACTOR	0.996	
TOTAL SAMPLING TIME	1395.0	MINUTES
TOTAL WATER COLLECTED	94.5	GRAMS
MOLECULAR WEIGHT	28.8	LB/LB-MOLE
SAMPLING DUCT AREA	1.25	SQ. FT.
TOTAL PARTICULATE COLLECTED	35.5	MG
GASEOUS FLUORIDE COLLECTED	5.30	MG
PARTICULATE FLUORIDE COLLECTED	3.99	MG
TOTAL FLUORIDE COLLECTED	9.29	MG
AVG ALUMINUM PRODUCTION RATE	409359	LBS./DAY/LINE
MANIFOLD ANEMOMETER VELOCITY	114.9	FT./MIN.
MANIFOLD THERMOCOUPLE TEMPERATURE	88.1	DEG. F
AVERAGE ROOF EXIT VELOCITY	89.2	FT./MIN.
AVERAGE ROOF EXIT TEMPERATURE	83.8	DEG. F
VOLUMETRIC FLOWRATE OUT ROOF	5697026	ACFM/LINE
VOLUME GAS SAMPLED	899.203	SCF
MOISTURE IN STACK GAS	0.492	%
VELOCITY OF STACK GAS (ACTUAL)	1231	FT./MIN.
VOLUMETRIC FLOWRATE IN DUCT	1515	SCFM
PERCENT ISOKINETIC - TRAIN TO DUCT	97.08	%
VOLUMETRIC FLOWRATE OUT ROOF	5522322	SCFM/LINE
PERCENT ISOKINETIC - MANIFOLD TO ROOF	96.99	%
SECONDARY PARTICULATE CONCENTRATION	6.09E-04	GRAINS/SCF
SECONDARY PARTICULATE EMISSION DUCT RATE	7.91E-03	LBS./HR.
SECONDARY PARTICULATE EMISSION DUCT RATE	9.28E-04	LBS./TON
ROOF-SECONDARY PARTICULATE EMISSION	28.84	LBS./HR.
ROOF-SECONDARY PARTICULATE EMISSION	3.38	LBS./TON
PRIMARY PARTICULATE EMISSION	1.45	LBS./TON
PRIMARY AND SECONDARY PARTICULATE EMISSION	4.83	LBS./TON
SECONDARY FLUORIDE CONCENTRATION	1.59E-04	GRAINS/SCF
SECONDARY FLUORIDE EMISSION DUCT RATE	2.07E-03	LBS./HR.
SECONDARY FLUORIDE EMISSION DUCT RATE	2.43E-04	LBS./TON
ROOF-SECONDARY FLUORIDE EMISSION	7.547	LBS./HR./LINE
AVG. ALUMINUM PRODUCTION RATE	8.53	TON/HR./LINE
PROCESS DATA CORRECTION FACTOR	0.002340	
ROOF-SECONDARY FLUORIDE EMISSION	0.885	LBS./TON
PRIMARY FLUORIDE EMISSION	0.218	LBS./TON
TOTAL PRIMARY AND SECONDARY FLUORIDE EMITTED	1.103	LBS./TON

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Stack Sample Results
Raw Data Averages
METHOD 14 LINE 2

Start Date: 11/3/2021 **Stop Date:** 11/4/2021 **Run #:** 3

Traverse Point	Delta P (in. Water)	Delta H (in. Water)	Meter Temperature (in)	Meter Temperature (out)	Static Pressure (in. Water)	Stack Temperature (Deg. F)
1-1a	0.13	1.45	69	67	-0.73	71
1-1b	0.12	1.35	74	70		72
1-2a	0.15	1.65	72	72	-0.72	75
1-2b	0.15	1.65	73	68		77
1-3a	0.14	1.55	71	71	-0.75	79
1-3b	0.14	1.55	71	71		79
2-1a	0.13	1.45	72	68	-0.73	75
2-1b	0.13	1.45	68	69		71
2-2a	0.14	1.55	74	74	-0.73	78
2-2b	0.14	1.55	75	71		78
2-3a	0.15	1.65	74	73	-0.74	77
2-3b	0.15	1.65	71	70		75
3-1a	0.10	1.10	75	73	-0.69	71
3-1b	0.10	1.10	74	73		72
3-2a	0.13	1.45	74	73	-0.71	73
3-2b	0.13	1.45	72	73		73
3-3a	0.12	1.35	73	73	-0.73	74
3-3b	0.13	1.45	73	71		69
Averages	**0.363** (AVG. SQ.RT.)	**1.467**	**71.8**		**-0.73**	**74.4**

MAGNITUDE 7 METALS LLC
METHOD 14 DATA
Line: 1 **2** 3 East 3 West
ROOF MONITOR

Run Start Date 11/3/21
Run End Date 11/4/21
Run # 3
Run Start Time 0905
Run End Time 08:20
Probe Tip SN 3164
Avg. Tip Diameter .3169
Delta H **1.91** 2% Moisture
Duct Area = 1.25 sq.ft. (assumed)

Operators
Jose Salvador
Heath Conway

Digital meter used **2076**
Initial L.C. @ 15.0 = .002
Final L.C. @ 10.0 = .001
Initial Pitot L.C. = Nil
Final Pitot L.C. = Nil

POINT #	SAMP. TIME Min.	METER VOLUME Cu. Ft.	DELTA P in. H_2O	DELTA H in. H_2O	METER TEMP F IN	METER TEMP F OUT	STATIC PRESS. in. H_2O	STACK TEMP. °F	IMP. TEMP. °F	HOT BOX TEMP. °F	PUMP VAC. in. Hg	SET PT.
1-1	155	347.300	.13	1.45	69	67	-.73	71	65	155	1.0	11.12
			.12	1.35	74	70		72	61	155	1.0	11.22
1-2	155	444.465	.15	1.65	72	72	-.72	75	62	155	1.2	11.12
			.15	1.65	73	68		77	62	155	1.2	11.04
1-3	155	551.210	.14	1.55	71	71	-.75	79	65	155	1.2	11.01
			.14	1.55	71	71		79	65	155	1.2	11.01
2-1	155	654.185	.13	1.45	72	68	-.73	75	62	155	.7	11.08
			.13	1.45	68	69		71	64	155	.7	11.13
2-2	155	755.700	.14	1.55	74	74	-.73	78	66	155	1.2	11.10
			.14	1.55	75	71		78	65	155	1.2	11.08
2-3	155	859.450	.15	1.65	74	73	-.74	77	67	155	1.2	11.11
			.15	1.65	71	70		75	65	154	1.2	11.08
3-1	155	966.580	.10	1.10	75	73	-.69	71	67	155	1.2	11.24
			.10	1.10	74	73		72	65	155	1.2	11.21
3-2	155	054.210	.13	1.45	74	73	-.71	73	64	155	1.2	11.19
			.13	1.45	72	73		73	64	155	1.2	11.16
3-3	155	152.810	.12	1.35	73	73	-.73	74	63	155	1.2	11.15
			.13	1.45	73	71		69	63	154	1.2	11.25
FINAL		250.380										
S/N		16895913					**76**	3-7	**2-A**	**2-H**		

Nomograph factor: 11.18

AP

MAGNITUDE 7 METALS LLC
METHOD 14 RAW DATA

Line: 2 Start Date: 11-3-21 Run: 3 Filter: 3C

PITOT TUBE — Circle to document visual inspection.

SN N7141

Visually inspected? (Yes)

PROBE TIP

SN 3164

DIAMETER MEASUREMENT (in.)

1. ~~.3170~~ .3170 AP If previous
2. .3170 calibration
3. .3185 referenced,
4. .3160 circle
5. .3180 Yes
6. .3170 to document
7. .3150 visual
8. .3165 inspection.

Out of round max. 0.004 in.

CAL. BY: MK

CALIPER: MITUTOYO S/N 7002015

NORANDA 0.5"
THICKNESS STD # 1 0.5

SAMPLER OPERATION

PROBE HEAT SETTING	HEATER BOX SETTING
248 deg. F. +/- 25 deg. F.	For Method 13
Range: 223 - 273 deg. F.	165 deg. F. +/- 15 deg. F.
	Range: 150 - 180 deg. F.
	For Method 315
	248 deg. F. +/- 25 deg. F.
	Range: 223 - 273 deg. F.

BAROMETER READING 30.14 (in. Hg)

CORRECTION FACTOR -.14 (in. Hg)

For Method 13 only:

ORIGINAL GASEOUS
FLUORIDE SAMPLE VOLUME — (liter)

		INITIAL WEIGHT	FINAL WEIGHT
IMPINGER #	+ 200 ml water	828.4	659.7
IMPINGER #	+ 100 ml water	747.5	801.9
IMPINGER #	+ EMPTY	625.7	648.2
IMPINGER #	+ SILICA GEL	1607.2	1793.5
IMPINGER #	+ SILICA GEL		
IMPINGER #	+ SILICA GEL		

BALANCE: METTLER PJ6000 SNR K59603 WEIGHED BY: MK

2 Kg Class S-1 Calibration Wt. 1999.9 Balance check must be +/- 0.5 grams.

COMMENTS:

AP

Magnitude 7 Metals LLC

GAS ANALYSIS REPORT

Location PL2 Date 11/3/24

Run 3

Room C Analyzed by JS

Run	Time	Percent Carbon Dioxide (CO_2)	Percent Oxygen (O_2)
1	10:30	~~.004~~ .04	20.9
2	10:35	.02	20.9
3	10:40	.02	20.9

Form: Gas Analysis Form single run.xls 12/9/19

Potline 2 Roof Exit Velocities and Temperatures

Manifold (C-66) Averages		Roof Averages	
WS (ft/min)	Temp (Deg. F)	WS (ft/min)	Temp (Deg. F)
114.9	88.1	89.2	83.8

	C-51			C-66			C-82		
Date/Time	WS (ft/min)	WD (Deg.)	Temp (Deg. F	WS (ft/min)	WD (Deg.)	Temp (Deg. F	WS (ft/min)	WD (Deg.)	Temp (Deg. F)
	_WS_AV	_WD_AV	_TEMP_	_WS_AV	_WD_AV	_TEMP_	_WS_AV	_WD_AV	_TEMP_
Averages:	56.6	164.6	80.6	114.9	140.0	88.1	96.1	135.0	82.9
11/3/21 9:05	48.9	182.2	80.2	128.4	143.9	84.9	95.7	140.8	77.7
11/3/21 9:20	52.9	166.0	79.7	119.4	145.6	85.1	101.7	139.8	78.5
11/3/21 9:35	53.9	161.9	79.7	112.5	141.2	85.3	103.2	138.5	79.3
11/3/21 9:50	49.7	179.4	79.7	121.9	143.5	84.8	104.7	135.8	79.4
11/3/21 10:05	48.4	190.1	79.9	123.1	146.5	85.9	100.3	135.5	80.5
11/3/21 10:20	60.1	166.1	78.1	114.1	137.1	85.4	92.8	132.3	81.8
11/3/21 10:35	58.8	162.7	78.1	121.6	145.4	85.2	92.9	129.5	83.0
11/3/21 10:50	59.9	163.6	78.7	118.2	145.1	85.7	86.8	128.2	82.9
11/3/21 11:05	59.5	165.5	78.9	119.4	141.1	87.3	86.5	133.4	84.7
11/3/21 11:20	61.7	154.9	78.6	97.3	132.7	87.2	90.6	133.5	84.6
11/3/21 11:35	59.0	164.6	78.6	105.2	133.6	87.1	88.0	129.3	85.2
11/3/21 11:50	58.9	167.7	78.6	111.2	140.3	86.2	81.6	129.2	84.0
11/3/21 12:05	61.7	151.7	77.5	99.9	142.7	86.2	86.3	125.4	85.3
11/3/21 12:20	61.6	157.1	77.4	99.8	139.9	86.2	86.3	125.3	86.1
11/3/21 12:35	56.8	156.4	77.4	107.0	138.6	87.3	85.3	128.4	85.6
11/3/21 12:50	62.7	154.1	76.7	111.8	132.0	86.2	88.6	124.8	86.8
11/3/21 13:05	66.4	155.9	78.0	108.0	135.7	87.8	99.7	134.7	86.8
11/3/21 13:20	54.1	160.0	79.9	103.4	134.6	88.2	85.7	136.8	86.2
11/3/21 13:35	56.7	156.5	80.0	100.1	130.9	90.4	88.7	138.3	87.2
11/3/21 13:50	58.1	167.8	80.0	111.1	139.8	89.0	97.9	136.6	87.1
11/3/21 14:05	53.1	159.7	78.4	96.9	128.5	89.5	89.9	136.4	88.1
11/3/21 14:20	55.4	161.6	80.4	99.0	130.5	91.0	95.0	140.1	88.6
11/3/21 14:35	58.3	169.2	81.8	103.5	135.7	90.3	89.8	136.0	86.6
11/3/21 14:50	54.6	162.8	81.8	103.5	131.8	90.7	93.2	133.7	88.0
11/3/21 15:05	60.5	157.3	83.8	87.9	138.1	91.1	91.5	136.4	86.4
11/3/21 15:20	62.2	154.4	84.3	100.8	132.0	92.5	88.3	136.3	87.9
11/3/21 15:35	55.7	153.6	82.5	103.9	136.9	91.3	88.0	130.1	88.1
11/3/21 15:50	55.5	161.3	83.4	103.6	134.9	91.4	93.2	134.8	87.1
11/3/21 16:05	66.4	154.0	83.0	107.4	137.5	92.5	95.0	136.8	88.2
11/3/21 16:20	64.3	157.6	84.2	108.3	130.6	94.4	91.8	135.3	90.0
11/3/21 16:35	57.8	157.4	83.4	105.7	130.3	92.9	94.7	134.2	90.2
11/3/21 16:50	60.1	166.7	84.8	100.8	134.9	92.9	102.0	138.0	90.3
11/3/21 17:05	57.0	158.0	83.6	107.0	132.5	92.2	99.0	133.2	90.4
11/3/21 17:20	50.6	168.2	83.8	97.9	136.1	92.2	92.5	140.1	88.3
11/3/21 17:35	48.9	168.2	82.1	112.1	141.1	91.3	93.9	134.0	88.3
11/3/21 17:50	42.7	171.8	81.6	120.2	142.2	90.4	101.0	131.8	88.3
11/3/21 18:05	53.4	180.3	83.1	132.3	145.1	90.8	98.1	133.8	86.7
11/3/21 18:20	61.0	165.6	83.7	127.0	140.8	90.6	102.9	135.1	86.5
11/3/21 18:35	61.2	167.7	83.6	114.8	145.0	89.6	102.1	135.2	86.0
11/3/21 18:50	40.4	183.1	82.7	123.2	142.1	89.5	102.9	135.2	86.0
11/3/21 19:05	42.6	168.4	81.3	127.3	139.1	90.8	94.4	131.2	86.4
11/3/21 19:20	48.7	173.0	82.5	132.9	143.6	91.6	87.0	131.5	86.2
11/3/21 19:35	49.7	168.6	83.2	125.3	144.5	91.6	94.4	134.3	86.0
11/3/21 19:50	53.9	162.8	85.3	121.2	148.5	93.0	89.4	131.3	85.5
11/3/21 20:05	56.7	160.6	85.1	120.4	145.9	93.1	85.6	132.1	85.0
11/3/21 20:20	54.1	164.1	85.6	125.2	149.8	93.6	79.2	126.9	84.9

	C-51			C-66			C-82		
Date/Time	WS (ft/min)	WD (Deg.)	Temp (Deg. F	WS (ft/min)	WD (Deg.)	Temp (Deg. F	WS (ft/min)	WD (Deg.)	Temp (Deg. F)
11/3/21 20:35	60.1	154.7	85.5	131.4	151.1	93.5	86.2	130.5	84.9
11/3/21 20:50	44.6	174.8	83.4	131.3	145.8	91.9	98.2	132.0	84.8
11/3/21 21:05	48.4	171.6	83.4	130.2	144.6	90.1	89.3	131.7	84.7
11/3/21 21:20	62.7	166.1	84.9	105.5	138.0	90.0	83.2	131.4	82.3
11/3/21 21:35	65.8	166.9	85.5	98.8	138.8	90.0	79.8	131.1	81.1
11/3/21 21:50	58.5	171.6	84.3	106.9	142.9	89.1	87.9	134.4	81.1
11/3/21 22:05	59.5	168.6	84.3	107.1	139.1	88.3	85.3	135.2	80.5
11/3/21 22:20	52.9	162.3	83.6	98.5	140.0	88.2	86.8	133.5	80.5
11/3/21 22:35	50.5	168.5	82.7	113.5	142.8	88.1	109.1	140.2	82.2
11/3/21 22:50	60.6	168.4	81.2	110.7	138.7	86.2	115.9	143.6	83.9
11/3/21 23:05	51.1	176.8	80.6	124.4	144.5	86.0	109.2	135.8	81.9
11/3/21 23:20	49.8	166.7	81.0	116.7	143.1	85.8	107.6	132.5	81.9
11/3/21 23:35	56.3	166.9	80.4	120.9	144.1	85.5	106.1	132.4	81.9
11/3/21 23:50	50.4	179.0	80.9	116.5	140.9	85.7	112.7	134.0	80.7
11/4/21 0:05	50.7	181.6	79.7	131.7	146.8	84.9	103.9	133.1	81.3
11/4/21 0:20	45.3	164.9	80.9	116.3	143.3	87.0	100.6	136.8	79.4
11/4/21 0:35	56.3	164.8	80.1	108.6	136.4	87.0	92.8	138.1	80.8
11/4/21 0:50	48.0	162.2	80.2	111.3	140.8	87.0	91.6	134.2	80.2
11/4/21 1:05	44.0	180.1	80.2	124.6	146.5	86.9	110.4	135.3	79.8
11/4/21 1:20	48.8	179.9	79.7	121.1	149.6	85.8	113.8	136.5	80.0
11/4/21 1:35	53.2	160.7	79.1	111.1	142.9	86.4	96.6	137.8	78.8
11/4/21 1:50	49.1	169.5	80.3	112.2	147.1	86.5	96.3	134.4	78.8
11/4/21 2:05	46.1	172.1	79.9	113.4	152.5	85.8	118.8	136.9	79.6
11/4/21 2:20	57.2	170.5	79.4	125.6	146.2	84.6	118.5	135.6	79.8
11/4/21 2:35	55.8	169.4	79.0	129.1	146.1	84.6	102.8	134.6	79.1
11/4/21 2:50	52.8	172.0	79.4	123.1	150.5	86.1	106.0	136.2	78.6
11/4/21 3:05	61.7	157.4	80.3	101.5	140.5	87.3	95.5	134.2	78.1
11/4/21 3:20	66.3	154.1	78.9	115.5	139.4	86.3	96.7	142.7	79.0
11/4/21 3:35	69.1	158.6	77.8	112.9	141.4	87.0	91.9	141.1	78.9
11/4/21 3:50	60.4	168.1	79.6	127.9	136.7	85.8	95.7	135.6	78.2
11/4/21 4:05	66.2	158.1	78.4	125.5	135.8	85.3	94.3	139.1	77.6
11/4/21 4:20	68.6	151.3	77.5	107.6	130.6	87.3	99.0	142.7	79.0
11/4/21 4:35	61.9	158.3	78.6	128.5	142.3	86.2	90.4	135.4	78.1
11/4/21 4:50	65.8	155.0	78.8	118.4	138.3	87.1	92.2	136.6	78.1
11/4/21 5:05	68.2	156.2	76.1	104.5	130.4	87.1	95.5	144.8	79.4
11/4/21 5:20	59.5	152.3	73.9	107.0	127.6	85.5	99.6	145.8	83.2
11/4/21 5:35	70.8	149.9	76.5	101.1	123.6	86.6	97.0	139.4	83.6
11/4/21 5:50	68.8	155.7	78.2	106.2	129.2	87.5	92.7	136.8	81.8
11/4/21 6:05	63.1	150.2	78.9	118.5	139.0	86.8	93.3	133.7	80.0
11/4/21 6:20	57.7	156.7	80.0	123.7	139.4	87.6	98.3	135.6	78.8
11/4/21 6:35	62.8	151.8	78.2	120.7	135.1	86.5	99.1	136.8	79.5
11/4/21 6:50	60.7	158.5	78.4	115.3	135.2	86.6	106.9	135.6	79.0
11/4/21 7:05	55.1	172.3	79.1	133.8	141.8	85.8	109.7	138.7	78.4
11/4/21 7:20	55.0	166.6	79.1	137.3	146.1	85.7	97.0	138.5	77.2
11/4/21 7:35	57.1	161.0	78.5	128.5	137.7	84.9	94.3	130.1	77.3
11/4/21 7:50	53.9	174.1	79.5	124.7	144.3	84.2	105.8	134.7	76.2
11/4/21 8:05	65.8	167.3	78.3	137.0	142.3	84.3	94.4	137.8	76.1
11/4/21 8:20	51.9	164.1	78.7	120.1	150.0	83.2	103.6	135.8	76.0